## CLAIMS

What is claimed is:

1. An electrospray device comprising:

a high voltage electrode chamber including an inlet for receiving a fluid to be ionized and for directing said fluid into said chamber and an outlet for transmitting said fluid out from said chamber;

at least one electrode having an exposed surface within said chamber, said electrode for electrolytically producing ions from said fluid, and

a flow channel for directing said fluid in a flow direction over said surface of said electrode, a length of said flow channel over said electrode in said flow direction being greater than a height of said fluid flowing over said electrode in said flow channel.

2. The electrospray device of claim 1, further comprising an emitter connected to said outlet for receiving said fluid from said outlet.

3. The electrospray device of claim 2, further comprising an auxiliary electrode remotely located from said chamber.

4. The electrospray device of claim 2, wherein said emitter comprises a non-electrically conductive capillary.

5. The electrospray device of claim 4, wherein said emitter further comprises a nebulizer.

6. The electrospray device of claim 1, wherein said flow channel comprises at least one capping member disposed on said electrode.

7. The electrospray device of claim 1, wherein at least one dimension of said flow channel is modifiable.

8. The electrospray device of claim 7, wherein said fluid height is modifiable.

9. The electrospray device of claim 7, further comprising a feedback and control system for modifying at least one dimension of said flow channel based on at least one measurement derived from said fluid transmitted from said chamber.

10. The electrospray device of claim 1, wherein a ratio of said length to said height is at least 10.

11. The electrospray device of claim 1, wherein a ratio of said length to said height is at least 100.

12. The electrospray device of claim 1, wherein said ratio of said length to said height is at least 1000.

13. The electrospray device of claim 6, wherein said capping member is formed from at least one chemically resistant polymer material.

14. The electrospray device of claim 1, further comprising an electrode support, wherein said electrode is disposed in said electrode support.

15. The electrospray device of claim 1, wherein said electrode support includes at least two of said electrodes.

16. The electrospray device of claim 15, wherein said at least two electrodes have different properties, said different properties being at least one selected from the group consisting of different electrochemical potentials, different kinetic properties and different catalytic properties.

17. The electrospray device of claim 15, further comprising structure for application of said different potentials to said at least two electrodes.

18. The electrospray device of claim 14, further comprising a capping member disposed on said electrode support.

19. The electrospray device of claim 14, wherein said capping member comprises at least one electrode.

20. The electrospray device of claim 19, wherein at least one electrode in said electrode support is formed from a first material and at least one electrode in said capping member is formed from a second material, said first material and said second material have different properties, said different properties being at least one selected from the group consisting of different electrochemical potentials, different kinetic properties and different catalytic properties.

21. The electrospray device of claim 20, further comprising structure for applying a potential difference between said at least one electrode in said electrode support and said at least one electrode in said capping member.

22. The electrospray device of claim 21, wherein said structure for applying a potential difference includes a voltage divider.

23. The electrospray device of claim 1, wherein said at least one electrode comprises at least two electrodes, further comprising a switching network for switching connection to a high voltage power supply between respective electrodes.

24. The electrospray device of claim 1, wherein said surfaces of said electrode is substantially planar.

25. The electrospray device of claim 18, wherein said electrode support and said capping member are substantially planar.

26. The electrospray device of claim 18, further comprising a flow member disposed between said capping member and said electrode support.

27. The electrospray device of claim 26, wherein said capping member includes at least one electrode.

28. An electrospray device comprising:

a substantially planar high voltage electrode support including at least one electrode having an exposed surface for electrolytically producing ions from fluid passing over said electrode, said electrode support forming a bottom of a fluid flow channel, and

a capping member forming a top of said flow channel, said flow channel for directing said fluid in a flow direction over a surface of said electrode, a length of said flow channel over said electrode in said flow direction being greater than a height of said fluid flowing over said electrode in said flow channel.

29. The electrospray device of claim 28, wherein said capping member includes at least one electrode.

30. A mass spectrometer, comprising,

a high voltage electrode chamber including an inlet for receiving a fluid to be ionized and for directing said fluid into said chamber and an outlet for transmitting said fluid out from said chamber;

at least one electrode having an exposed surface within said chamber, said electrode for electrolytically producing ions from said fluid, and

a flow channel for directing said fluid in a flow direction over said surface of said electrode, a length of said flow channel over said electrode in said flow direction being greater than a height of said fluid flowing over said electrode, and

an orifice plate remotely located from said chamber for receiving gas phase ions emitted from said emitter under influence of an electrical field between said electrode and said orifice plate.

31. An electrochemical cell, comprising:

a high voltage electrode chamber including an inlet for receiving a fluid to be ionized and for directing said fluid into said chamber and an outlet for transmitting said fluid out from said chamber;

at least one electrode having an exposed surface within said chamber, said electrode for electrolytically producing ions from said fluid, and

a flow channel for directing said fluid in a flow direction over said surface of said electrode, a length of said flow channel over said electrode in said flow direction being greater than a height of said fluid flowing over said electrode, and

a counter electrode disposed remotely from said electrode chamber.

32. The electrochemical cell of claim 31, further comprising a reference electrode in said electrode chamber.

33. A method of creating charged droplets, comprising the steps of:

providing a high voltage electrode chamber including an inlet for receiving a fluid to be ionized and for directing said fluid into said chamber and an outlet for transmitting said fluid out from said chamber; at least one electrode having an exposed surface within said chamber, said electrode for electrolytically producing ions from said fluid, and a flow channel for directing said fluid in a flow direction over said surface of said electrode, a length of said flow channel over said electrode in said flow direction being greater than a height of said fluid flowing over said electrode,

flowing said fluid into said electrode chamber, wherein said fluid flows in said flow direction over said electrode, said length over said electrode in said flow direction being greater than said height over said electrode in said flow direction.

34. The method of claim 33, further comprising the step of emitting a plume of gas phase ions from ions generated by said electrode.

35. The method of claim 33, wherein said electrode comprises at least two electrodes, further comprising the step of dynamically switching an electrical potential between respective ones of said at least two electrodes.

36. The method of claim 33, wherein said electrode comprises at least two electrodes, further comprising the step of applying a potential difference between at least two of said at least two electrodes.

37. The method of claim 33, further comprising the step of dynamically changing at least one dimension of said flow channel.

38. The method of claim 37, wherein said at least one dimension includes said channel height.

39. The method of claim 37, wherein said dynamic changing is responsive to at least one measured parameter relating to said fluid, said measured parameter being derived from said fluid.

40. The method of claim 39, wherein said dynamic changing comprises altering a force applied to said electrode chamber, wherein said channel height is modified.

41. The method of claim 33, wherein said plume of gas phase ions are used for at least one process selected from the group consisting of ion mobility spectrometry, drug delivery by inhalation, spot preparation for matrix-assisted laser desorption mass spectrometry, crop dusting, paint spraying, ink jet printers, ink jet spotters, surface preparation of thin films and mass spectrometry.